

## ABSTRACT

It is possible to establish an estimation method capable of logically and optimally deciding a forgetting coefficient and develop an estimation algorithm and a high-speed algorithm which are numerically stable. Firstly, a processing section reads out or receives an upper limit value  $\gamma_f$  from a storage section or an input section (S101). The processing section decides a forgetting coefficient  $\rho$  by equation (15) (S103). After this, according to the forgetting coefficient  $\rho$ , the processing section executes a hyper H<sub>∞</sub> filter of equations (10-13) (S105). The processing section (101) calculates the existence condition of equation (17) (or equation (18) which will be given later) (S107). When the existence condition is satisfied at all the times (S109),  $\gamma_f$  is decreased by  $\Delta \gamma$  and the same processing is repeated (S111). On the other hand, when the existence condition is not satisfied by a certain  $\gamma_f$  (S109), the  $\Delta \gamma$  is added to the  $\gamma_f$  and the sum is output to an output section and/or stored in the storage section as an optimal value  $\gamma_f^{OP}$  of the  $\gamma_f$  (S113).